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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/856,030 | 05/16/2001 | Yasushi Nakagiri | 10059-384US | 2244 |

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2005 MARKET STREET, SUITE 2200
PHILADELPHIA, PA 19103-7013

EXAMINER

CREPEAU, JONATHAN

| | |
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| ART UNIT | PAPER NUMBER |
|----------|--------------|

1746

DATE MAILED: 02/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/856,030

Applicant(s)

NAKAGIRI ET AL.

Examiner

Jonathan S. Crepeau

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-- **Th MAILING DATE of this communication app ars on the cover sheet with the correspondence address --**

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-214008 in view of JP 11-3707 and Nimon et al (U.S. Patent 6,017,651).

Regarding claim 1, JP '008 discloses a lithium battery comprising a positive electrode and negative electrode (see paragraph 19 of the machine translation). Regarding claims 1 and 2, the positive electrode comprises a mixture of elemental sulfur powder, a metal complex of an organic sulfur compound having a thiol or thiolate group, and a conductive polymer (see paragraphs 7, 12, 17, and 18).

JP '008 does not expressly teach that the positive electrode comprises a lithium-sulfur compound represented by the formula $(Li_xS)_n$, or that the negative electrode contains a composite nitride of the formula $Li_{3-x}M_xN$, as recited in claim 1.

The patent of Nimon et al. is directed to lithium polymer batteries. In the abstract, the reference teaches that a sulfur electrode including at least one of elemental sulfur, lithium sulfide, and a lithium polysulfide is provided.

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In the abstract, JP '707 discloses a secondary battery comprises a negative electrode comprising $\text{Li}_{3-x}\text{M}_x\text{N}$ ($0.1 \leq x \leq 0.8$, $\text{M}=\text{Ti, V, Cr, Mn, Fe, Co, Ni, or Cu}$).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of JP '707 would motivate the artisan to use a nitride of the formula $\text{Li}_{3-x}\text{M}_x\text{N}$ as the negative electrode active material of JP '008. In the abstract, JP '707 teaches that "deterioration of battery characteristics at high temperature storage times can be retarded" by using this active material. Accordingly, the artisan would be motivated to use this nitride as the negative electrode active material of JP '008.

Furthermore, the disclosure of Nimon et al. indicates that lithium sulfides and polysulfides are functionally equivalent to the elemental sulfur disclosed by JP '008. Therefore, it would be obvious to substitute the lithium sulfide of Nimon et al. for the elemental sulfur of JP '008. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06. Further, the artisan would be guided to use Li_2S_8 (i.e., $(\text{Li}_{0.25}\text{S})_8$) as the lithium sulfide of JP '008, since this material is disclosed at column 12, line 7 of Nimon et al. Accordingly, the subject matter of claim 1 would be rendered obvious.

3. Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-214008 in view of JP 11-3707 in view of Nimon et al. as applied to claims 1 and 2 above, and further in view of Kawakami et al (U.S. Patent 6,372,387) and Idota (U.S. Patent 5,618,640).

JP '008 does not expressly teach that the negative electrode further comprises a metal oxide such as SnO or SnO₂.

In column 53, lines 58-67, Kawakami et al. teach a secondary battery comprising a negative electrode comprising at least one of a tin oxide, a lithium tin oxide, and a lithium transition metal nitride, among other materials.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would find it obvious to add tin oxide or lithium tin oxide to the negative electrode of JP '008. It has been held to be *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose. *In re Kerkhoven*, 205 USPQ 1069 (CCPA 1980). Thus, it would be obvious to use a tin oxide in addition to the lithium transition metal nitride in the negative electrode of JP '008. Furthermore, Idota et al. teach exemplary tin oxide active materials of SnO, SnO₂, and Li₂SnO₃ in Table C-1 (col. 30). Therefore, the artisan would be guided to use these materials in the negative electrode of JP '008.

4. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-214008 in view of JP 11-3707 in view of Nimon et al. as applied to claims 1 and 2 above, and further in view of Arai et al (U.S. Patent 6,475,680) and JP 10-162823.

JP '008 does not expressly teach that the negative electrode further comprises a tin or silicon intermetallic compound.

In column 7, lines 37-46, Arai et al. teach a secondary battery comprising a negative electrode comprising a nitride or an “intermetallic particle compound such as aluminum, tin, and the like,” among other materials.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would find it obvious to add tin or silicon intermetallic material to the negative electrode of JP ‘008. It has been held to be *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose. *In re Kerkhoven*, 205 USPQ 1069 (CCPA 1980). Thus, it would be obvious to use a tin or silicon intermetallic material in addition to the lithium transition metal nitride in the negative electrode of JP ‘008. Furthermore, JP ‘823 teaches exemplary tin and silicon intermetallic active materials such as Si-Ni, Si-Fe, Sn-Fe, and Sn-Ni in the abstract. Therefore, the artisan would be guided to use these materials in the negative electrode of JP ‘008.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (703) 308-4333. The phone number for the

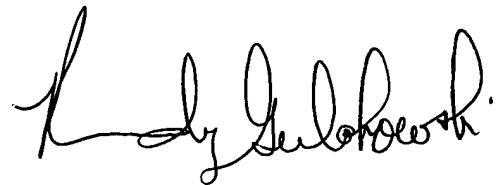
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organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 305-5408 or (703) 305-5433.

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

JSC

February 20, 2003

A handwritten signature in black ink, appearing to read "Randy Gulakowski". The signature is fluid and cursive, with a large initial "R" and "G".

RANDY GULAKOWSKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700